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Comment

Interactive comment on “Water content of aged aerosol” by G. J. Engelhart et al.

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This is an interesting paper which presents new results about the potential to use the AMS to measure particulate water. At face value, the results would suggest that no particle-phase water is lost in the AMS lens, which conflicts with the experimental results of Matthews et al. (AS&T 2008) and Zelenyuk et al. (Anal. Chem., 2006).

This apparent conflict may be resolved by using a relative ionization efficiency (RIE) for water in the AMS which is larger than the value of 1.0 assumed in this study. To my knowledge a value of RIE_{H2O} has not been published, but several groups have independently concluded that RIE_{H2O} has a value between 2 and 4, as discussed at several AMS Users Meetings, including the recent 2010 meeting in Hyytiälä. Using those RIE_{H2O} values, the results of this paper can be interpreted as a loss of 50–75% of the original particle-phase H₂O, but with the amount of water remaining in the

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particles being proportional to the amount of water originally present in them.

The reasons for the relatively high RIE_H2O may be related to its low m/z, analogously to the similarly high values of RIE_NH4 (really ionized as NH3(g)) which are typically in the range 3-4, as routinely measured as part of the AMS calibration with NH4NO3. Clearly additional research on both RIE_H2O and on the proportionality between particle-phase H2O before and after the AMS inlet is needed. If the latter is found to hold in additional studies and a wide range of environments, it would be a very useful (if unexpected, at least by me) addition to the measurement capabilities of the AMS.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 21653, 2010.

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